

# FLIGHT

The  
AIRCRAFT  
ENGINEER  
&  
AIRSHIPS

First Aero Weekly in the World

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

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## Flight

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### DIARY OF FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in the following list:—

|              |   |
|--------------|---|
| <b>1924</b>  |   |
| Oct. ....    | Schneider Cup Race, Baltimore.  |
| „ 16 ....    | Dr. A. Rohrbach (of the Rohrbach Metall-Flugzeugbau Co.) "Large All-Metal Seaplanes," before R.Ae.S.                                      |
| „ 30 ....    | Major J. S. Buchanan, A.F.R.Ae.S. (of the Technical Department, Air Ministry): "The R.Ae.C. Light Aeroplane Competitions," before R.Ae.S. |
| Nov. 13 .... | Professor L. Birstow, C.B.E., F.R.S., F.R.Ae.S. (Zaharoff Professor of Aeronautics, University of London): "Skin Friction."               |
| „ 27 ....    | Dr. G. C. Simpson, C.B.E., F.R.S. (Director, Meteorological Office): "Thunderstorms."   |
| Dec. 4 ....  | Colonel F. Searle, C.B.E., D.S.O. (Managing Director, Imperial Airways, Ltd.): "The Maintenance of Commercial Aircraft."                  |
| „ 5-21       | Paris Aero Show.  |
| „ 18 ....    | Mr. A. R. Watson Watt (Superintendent, Radio Research Board Station): "Recent Studies on Radiotelegraphic Atmospherics."                  |
| <b>1925</b>  |   |
| Feb. 5 ....  | Air Commodore C. R. Samson, C.M.G., D.S.O., A.F.C., A.F.R.Ae.S.: "The Operation of Flying Boats in the Mediterranean."                    |

## EDITORIAL COMMENT.



"GASBAGS" (as they used to be sneeringly called) are very much in the air at the moment, literally as well as figuratively. The American "Shenandoah" is at present engaged upon a journey across the United States, having already flown from New Jersey down the Atlantic coast and across to California. The "Z.R. 3" (L.Z. 126) left her base at Friedrichshafen on Lake Constance on Sunday, October 12, proceeding across France and Spain, out over the Atlantic via the Azores and Bermuda to Lakehurst, New Jersey, her new home in America. At the moment of writing, the "Z.R. 3" has just arrived in America, after having made a journey of approximately 5,500 miles in a little over three days, having had to circumnavigate a storm which prevented her taking the more direct route. Thus once more the Atlantic crossing has been accomplished. Finally, on Friday, October 17, Commander Boothby will read before the Institution of Aeronautical Engineers a paper entitled "Commercial Airship Design." Thus, there is a "certain liveliness" in the airship world just now, not forgetting the resumption of airship work in this country, where the construction of two 5-million cubic feet ships is to be undertaken.

The cruise of the "Shenandoah" has, as far as can be gathered, been highly successful, the minor mishap at San Diego not being regarded as in any way serious. The airship has been seen by thousands of enthusiastic Americans during her voyage, and very naturally the interest in airships is very intense in the United States at the moment.

The transatlantic voyage of the "Z.R. 3," the reparations airship built by the Zeppelin Company for the United States, has been, as far as is known, equally successful. Of a total gas capacity of 70,000 cubic metres (2,470,000 cubic ft.) the "Z.R. 3" has a disposable lift of approximately 40 tons, and represents in her design and construction the latest practice in rigid airship work. Her cabin is fitted up after the fashion of Pullman cars, and folding berths are provided for the passengers. It is not definitely known

to what use the "Z.R. 3" will be put when taken over by the United States Government, but it may be taken for granted that both she and the "Shenandoah" will be used for experimental services in order to discover what really are the capabilities of large rigid airships.

In the case of our own airships it will, we fear, be a matter of three years or so before the first one can be expected to be ready for flight, and in the meantime America will doubtless have learned a great deal from practical trials with her two existing airships.

We do not think, however, that this fact need cause us undue anxiety. It is true, of course, that the Zeppelin engineers have had vastly greater experience in airship design and construction than anybody else, but provided we go to work carefully, and airship research is not hampered by lack of funds, the position of Great Britain should not be by any means hopeless, as regards this branch of aircraft engineering. The one doubtful factor, to our way of thinking, is the decision to build ships of 5 million cubic ft. capacity. The "Z.R. 3" is of but half that size, and it is to be assumed that the doubling of capacity cannot be effected without introducing certain experimental features. That is to say it is not, we think, possible to design, from existing knowledge, ships of this

size without carrying out first a considerable amount of research work. Provided this is done, however, the problem should not present insurmountable difficulties.

In the meantime, the United States are to be congratulated upon having secured, in the "Z.R.3," what is probably the finest rigid airship ever built, and we hope to see in the future a healthy rivalry between America and this country in the establishment of world air routes. The flight of the "Z.R.3" with her German crew must have provided useful data, and these doubtless will be placed at the

disposal of her new owners, to the benefit of the United States in particular, but to a not inconsiderable extent also to the advantage of the world in general. By the trans-atlantic flight another milestone has been reached in the progress of aviation, and the day seems to have been brought very appreciably nearer when these craft cross oceans and continents with as great regularity and at much greater speed than any hitherto attained over long distances.

The third crossing of the Atlantic should not be

allowed to pass without some reference to the first two journeys, so gallantly accomplished in 1919 by the British rigid airship "R.34" in command of Major Scott. In every respect an inferior ship to the "Z.R. 3," the "R.34" had the honour of being the first airship to cross the Atlantic, and the glory of that famous flight is all the greater when it is realised that the airship on which it was made was not to be compared as regards efficiency with the latest ship.

The Commander of the "R.34," Major Scott, is almost the only British airship officer of long experience to survive, most of those who made the famous crossing with him having lost their lives, with many others, in the very regrettable accident to "R.38."

In rejoicing over what might almost be termed the renaissance of airships we should not forget to pay a tribute to those gallant men of the "R.38" who gave their lives in the cause of progress, and we like to think that in taking up airship work again in this country Great Britain is at last doing that which those who perished would have most wished her to do. To have abandoned airships for good would be akin to betraying those who gave their lives in the good cause. By carrying on we can at least feel that their sacrifice will not have been in vain.



**ACROSS THE ATLANTIC :** The Z.R.3 photographed over Berlin on her recent visit. The airship is here seen flying over the Cathedral.



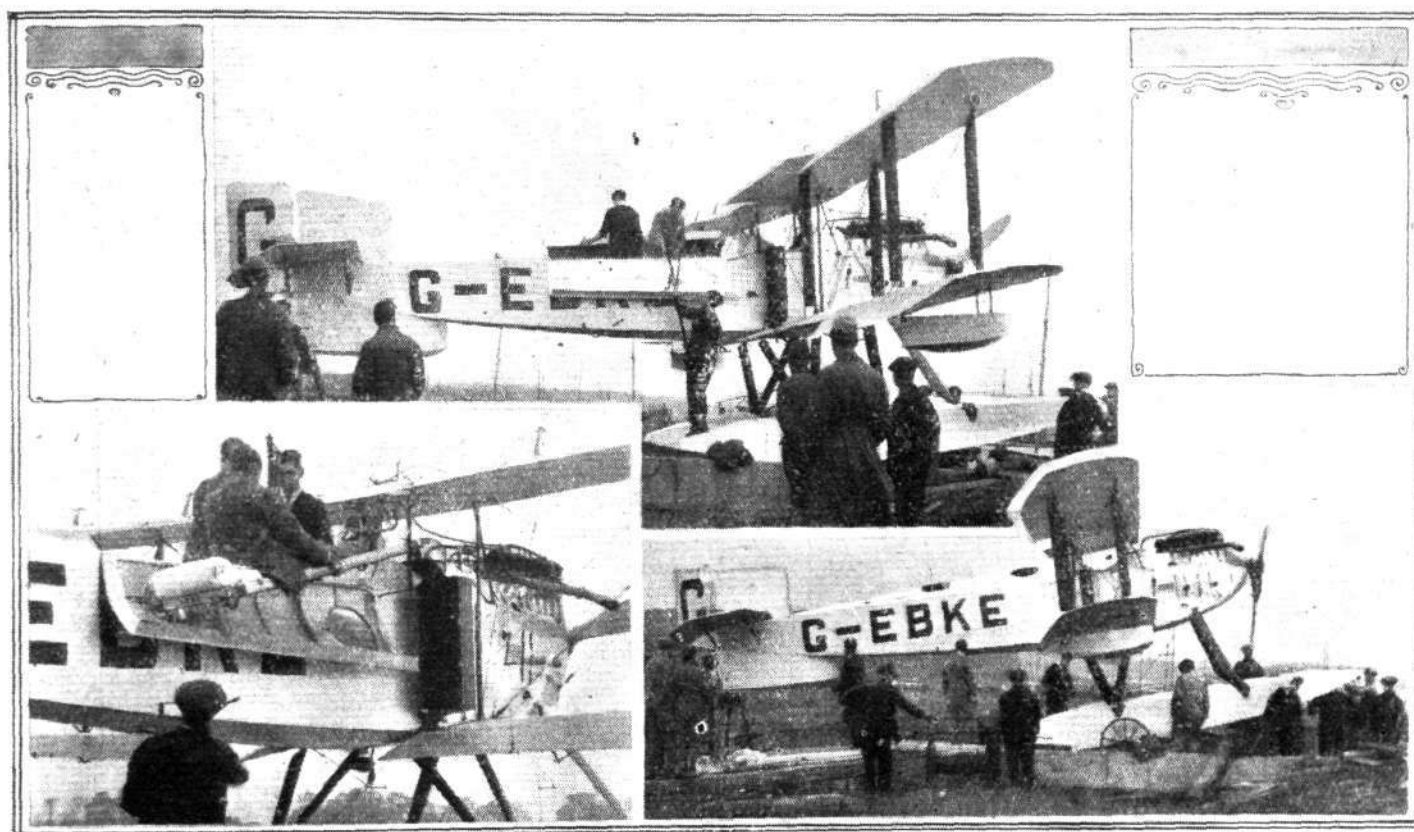
## THE FAIREY AMBULANCE SEAPLANE

LAST Friday we witnessed at Hamble the acceptance tests of a new seaplane built by the Fairey Aviation Co., Ltd., of Hayes, to the order of a company interested in large plantations and estates in British Guiana. This machine, which is being dispatched immediately for service out in British Guiana, has been specially equipped for particular duties there, and forms a most interesting example of the serious application of flying for civil purposes. The bare distance between the Company's properties and the nearest township, Georgetown, is a little over 200 miles, yet the journey by water, even under the best conditions, takes no less than 17 days owing to the many rapids in the rivers and repeated portages necessary.

Owing to the marshy nature of the country and the luxuriant tropical vegetation the cost of road or rail building renders it impracticable for the purpose, and the river is the only means of communication at present. Many important industries, including balata, diamond mining and sugar growing, are dependent on the river for transport in this manner. The seaplane, however, will reduce the journey to little over two hours—the biggest reduction so far obtained

opened. Each of these hinged portions is very strongly constructed, and serve as platforms on which the attendant can stand when assisting the patient into or out of the machine. For serious cases provision is made for hoisting up the stretcher containing the patient by means of a strong but compact hoisting gear—which can be mounted on either side of the fuselage—similar to a boat's davit on a ship. It is thus possible to raise the patient up over the fuselage and then lower him gently into position, stretcher and all, within the fuselage. The hoisting gear, it may be mentioned, is not necessarily carried on the seaplane, but is part of the equipment at the bases.

When the patient is safely stowed inside the fuselage, the two hinged sections are closed, and the fuselage assumes its normal shape and appearance, as may be seen from one of the accompanying views. The hinged decks are each provided with two large windows, which can be opened or closed as desired. The stretcher is located on the port side of the fuselage, and alongside, on the starboard side, are two seats, one forward and one aft; a lavatory is also provided.



**THE FAIREY AMBULANCE SEAPLANE:** Three views of the Fairey 111-D seaplane (Rolls-Royce "Eagle IX" engine), which has been specially fitted out as an ambulance for service in British Guiana. On the left, the "patient" is shown being hoisted up on the stretcher by means of a portable winch. In the centre, the "patient" is safely stowed inside the fuselage, and the hinged fuselage-top is being closed down. Right, general view of the machine ready for flight.

on any route. In the present case, the importance of rapid communication is chiefly with regard to illness. White men developing fever on the plantations are in serious danger, and must be conveyed to Georgetown for treatment. The long journey under the very bad conditions as to heat and discomfort are such that many do not survive the journey. It is considered, therefore, that the new service will result in the saving of many lives.

As regards the machine itself, this is one of the famous and successful Fairey 111-D type seaplanes, equipped with a 360 h.p. Rolls-Royce "Eagle IX" engine. This machine, which we illustrate herewith, has been specially fitted out to meet the various requirements demanded. In addition to the pilot, who is located forward, the machine has accommodation for one stretcher case and attendant, plus ice, drinking-water, and the usual medical supplies.

The "casualty ward" is located immediately aft of the pilot's cockpit, and provision is made within this portion of the fuselage for placing a stretcher longitudinally on strong supports, where it is safely secured by locking pins. The top deck of the fuselage, at this section, hinges outwards, in two sections, one hanging down on each side of the fuselage when

The machine is also equipped with a special Marconi wireless installation, located forward of the "casualty ward," and operated by the pilot, admitting of telegraphic and telephonic communication throughout the flight with both ends of the route—special wireless stations having been erected for this purpose.

The machine is specially built to resist the tropical conditions, the float bottoms being covered with stainless steel, and specially coated. Special precautions have been taken throughout the construction of the machine to cope with the hot and humid conditions, as Georgetown is only 5 degs. North of the Equator. When desired the machine is rapidly converted for carrying passengers or supplies. A Fairey-Reed duralumin airscrew will be used, as it is not expected that the wooden ones would stand the climate. Proper buildings, slipways, etc., have been erected out in British Guiana, and the whole work carried out in a most thorough manner, whilst the personnel have been trained in the works of the Fairey Co., and the chief pilot of the new enterprise will be Capt. G. N. Trace, late R.A.F.

At the official tests the machine flew splendidly in spite of very adverse weather conditions.

# THE STOUT "AIR PULLMAN"

America's First All-Metal Commercial 'Plane

Tests were recently completed at Selfridge Field, U.S.A., of America's first all-metal commercial aeroplane. This machine has been built by the Stout Metal Airplane Company, of Detroit, and the main objects of its design are safe and profitable air transport. To this end no attempt has been made to follow military design in any way, nor to build from old war-stock material for the sake of economy. In short, it has been specially designed for commercial work, and embodies some of the latest refinements in aeroplane design.

The Stout "Air Pullman," as the passenger model is called—the freight or mail model being known as the "air truck"—is a cantilever monoplane, resembling in general appearance the well-known Fokker commercial monoplanes. As a matter of fact, however, the Stout monoplane differs considerably in construction from the Fokker. In the first place, it is built entirely of metal, mainly of duralumin in corrugated form—after the style of the Junkers—and, secondly, it differs in certain aerodynamical features, while its total weight comes out some 1,000 lbs. less.

Fitted with a 400 h.p. "Liberty" engine, this machine, when tested by Test-Pilot Walter E. Lees, carried a useful load of 2,379 lbs. (including a pay load of 1,280 lbs. and fuel for 4 hours' flight) at a speed of 116 m.p.h., and climbed to 5,000 ft. in 12 minutes.

The overall dimensions of this machine have been chosen to suit the greatest range of commercial use and the greatest variety of aerodromes possible with present-day conditions. The major items of design were laid out for the most possible hours per day in the air, with all assemblies and units so arranged that they may be instantly inspected and quickly replaced. For instance, it is claimed that it is possible to change the complete engine unit and fit a new one ready for flight in less than half an hour.

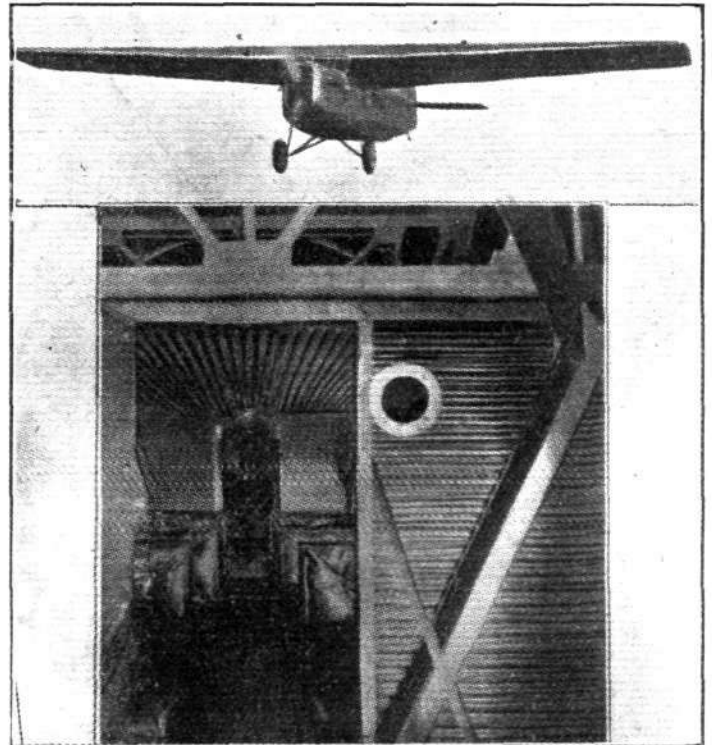
It is a seven-passenger-and-pilot enclosed cabin machine, and the passenger cabin is equipped with six deep upholstered seats, with plenty of leg-room. At the front of the cabin, in full view of the passengers, are mounted an air-speed indicator and an altimeter. When required, the two rear seat pairs fold together to form benches on the side facing each other, with a table arranged between. Meals can be served on this table from a small galley located at the rear of the passenger cabin. Pivoted semi-circular windows give the passengers an excellent view all round and below.

In front of the passenger cabin are two partitions about 3 ft. apart, enclosing a toilet and washroom. From this room it is possible to reach overhead to the luggage compartment, situated out in the wings. Here also the petrol tanks can be inspected, and every part of the petrol system up to the dashboard inspected or repaired during flight. The tanks are so arranged that in filling up no fuel can possibly be spilled into the wings. Right forward, below the leading edge of the wings, is the pilot's cabin, which has two seats side by side and dual control, and is fully equipped with all necessary navigating instruments, etc. The cabin is large enough to stand up in, and the pilot's wind-shield forms a part of the leading edge of the wing in such a manner as to interfere as little as possible with the latter's aerodynamical efficiency. The sides of the pilot's cabin are left entirely open, and the

pilots who prefer it may fly "out of doors." Swinging windows are arranged, however, so that if required this compartment can be entirely enclosed. The pilot has a clear view forward and downward, although the wing obstructs his view upwards and to the rear.

Very solid doors between the passenger cabin and the pilot's compartment form two bulkheads, while the dashboard forms a third between the engine and the rest of the fuselage. Very little engine vibration or noise therefore gets to the passengers.

The wing, which is of thick section (being almost 3 ft. deep at the centre where the chord is about 12 ft.) is mounted on the top of the fuselage. It is divided into three sections, a centre section secured to the fuselage by six large bolts from the



THE STOUT "AIR PULLMAN": Above the machine is shown in flight, and below is an interior view of the cabin.

three main spars, and two outer sections detachable for transportation purposes or replacement.

The engine installation is very accessible, the base of the engine mount fastening to the fuselage being extra wide, giving great rigidity and at the same time placing the structural work far enough from the engine itself so that everything is get-at-able. The engine is a standard 400 h.p. Liberty model, but fitted with a new intake manifold which is the



THE STOUT "AIR PULLMAN": An all-metal commercial aeroplane built in America. It is fitted with a 400 h.p. "Liberty" engine.



latest development of the Air Service. New heavy timing gears have also been fitted, and the new type jump-gap "Delco" distributing system. The generator is wound for 12 volts for a large battery, which not only takes care of the ignition, but a Bijur electric self-starter with which the plane is fitted, the foot button and controls being between the pilots so that either one can operate the engine. The engine is muffled by running exhaust pipes back along the sides of the fuselage to the rear of the cabin. These pipes are constructed of duralumin and drilled for a gradual muffling effect. Openings to the cabin furnish ample heating for winter work.

The petrol system includes two aluminium tanks of 75 gals. capacity, each placed out in the wings 12 ft. apart and well above the engine so that gravity feed is used without the complication of pump or air pressure. All petrol lines are flexibly jointed with metal connections inside the rubber hose to prevent any parts working in, and they are also wound with tape and shellaced in the engine unit to prevent vibration. The water system with radiator and shutters is a unit with the engine mount, as is the entire oil system. The oil tank is supported under the engine just forward of the pump with a line running forward to join with a copper pipe which runs through inside the bottom part of the water radiator, giving about 4 ft. of pipe inside the water. In this way the oil is warmed in winter and cooled in summer to an approximate engine temperature.

One of the special features of the Stout "Air Pullman" is the landing gear. This is of the divided type, without axle or cross tubes which would be likely to cause trouble

by catching on weeds or long grass. The wheels have 8-ft. spacing, and spring individually with 12 in. of spring action, in addition to the cushioning effect of the 8-in. by 36-in. tyres. The shock-absorber chords are arranged externally on the fuselage at the top of struts leading from the wheel hubs, and work with a sliding guide plate. This landing gear gives exceptionally soft and smooth landing. Floats can be fitted in place of the wheels if required.

This machine is particularly suitable for carrying mails along with express matter, a spacious compartment for mails being provided. With a load of 1 ton, it will make approximately 5 miles per gallon. The main characteristics of the Stout "Air Pullman" are:—

|                       |    |    |    |                                |
|-----------------------|----|----|----|--------------------------------|
| Span                  | .. | .. | .. | 58 ft. 4 ins.                  |
| Chord                 | .. | .. | .. | 7 ft. 9 ins. to 12 ft. 10 ins. |
| Height                | .. | .. | .. | 11 ft. 10 ins.                 |
| O.a. length           | .. | .. | .. | 45 ft. 8 ins.                  |
| Wing area             | .. | .. | .. | 600 sq. ft.                    |
| Weight, empty         | .. | .. | .. | 3,638 lb.                      |
| Useful load           | .. | .. | .. | 2,379 lb.                      |
| Total weight          | .. | .. | .. | 6,017 lb.                      |
| Wing loading          | .. | .. | .. | 9.85 lb./sq. ft.               |
| Power loading         | .. | .. | .. | 14.8 lb./h.p.                  |
| Speed range           | .. | .. | .. | 53-116 m.p.h.                  |
| Rate of climb         | .. | .. | .. | 500 ft./min.                   |
| Climb to 5,000 ft.    | .. | .. | .. | 12 min.                        |
| Ceiling               | .. | .. | .. | 12,000 ft.                     |
| Duration (full speed) | .. | .. | .. | 4 hrs.                         |

## The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

### THE GROSVENOR CHALLENGE CUP

(Under the Competition Rules of the Royal Aero Club)

#### 100 MILE HANDICAP RACE

Eight Laps of Course—Lympe Aerodrome, Postling, and Hastings (12½ miles).

#### NET LAP TIMES

| Machine.                     | No.  | Lap 1. | Lap 2. | Lap 3. | Lap 4. | Lap 5. | Lap 6. | Lap 7. | Lap 8. | Net Flying Time. | Miles per Hour. | Order of Finish. |
|------------------------------|------|--------|--------|--------|--------|--------|--------|--------|--------|------------------|-----------------|------------------|
|                              |      | m. s.  | m. s.  | m. s.  | m. s.  | m. s.  | m. s.  | m. s.  | m. s.  | h. m. s.         |                 |                  |
| Westland "Wood Pigeon"       | 5    | 13 14  | 12 2   | 12 7   | 12 5   | 12 4   | 12 17  | 12 11  | 11 31  | 1 37 31          | 61.53           | 2                |
| Avro "Avis"                  | 10   | 11 30  | 11 23  | 11 27  | 11 25  | 11 28  | 11 22  | 11 18  | 11 12  | 1 31 5           | 65.87           | 1                |
| Westland "Wood Pigeon II"    | 6    | 14 31  | 12 59  | 12 54  | 12 45  | 13 1   | 12 21  | 12 19  | 13 49  | 1 44 39          | 57.33           | 9                |
| Supermarine "Sparrow"        | 9    | 12 43  | 12 3   | 12 3   | 12 3   | 11 52  | 12 2   | 12 2   | 11 51  | 1 36 39          | 62.08           | 4                |
| Vickers "Vagabond"           | 16   | 17 55  | 10 58  | 10 51  | 10 50  | —      | —      | —      | —      | —                | —               | R                |
| Bristol "Brownie"            | 2    | 11 43  | 10 49  | 10 36  | 10 32  | 10 30  | 10 31  | 10 28  | 10 27  | 1 25 36          | 70.09           | 3                |
| Parnall "Pixie III"          | 18   | 11 9   | 10 50  | 10 51  | 10 44  | 10 44  | 10 46  | 10 50  | 10 32  | 1 26 26          | 69.41           | 5                |
| Short "Satellite"            | 8    | 11 50  | 11 6   | 11 1   | 11 7   | 11 5   | 10 59  | 11 2   | 10 55  | 1 29 5           | 67.35           | 7                |
| D.H.53                       | EBH  | 11 38  | 11 6   | 11 11  | 11 7   | 11 5   | 11 10  | 11 5   | 10 49  | 1 29 11          | 67.27           | 8                |
| Vickers "Viget"              | EBHN | 11 25  | 11 17  | —      | —      | —      | —      | —      | —      | —                | —               | R                |
| "Cygnets II"                 | 14   | 13 4   | —      | —      | —      | —      | —      | —      | —      | —                | —               | R                |
| A.N.E.C.                     | 7    | 11 5   | 10 34  | 10 35  | 10 35  | —      | —      | —      | —      | —                | —               | R                |
| R.A.E. Aero Club "Hurricane" | 20   | 10 21  | 9 31   | 9 27   | 9 36   | 9 34   | 9 23   | —      | —      | —                | —               | R                |
| Parnall "Pixie II"           | 21   | 10 2   | 9 24   | 9 27   | 9 28   | 9 31   | 9 29   | 9 22   | 9 22   | 1 16 5           | 78.86           | 6                |

Fastest lap: Parnall "Pixie II," 9 m. 22 s. = 80.007 m.p.h.

Fastest time for course distance (100 miles): Parnall "Pixie II," 1 h. 16 m. 5 s. = 78.86 m.p.h.

A. G. REYNOLDS, *Timekeeper.*

Issued by the Royal Aero Club.

HAROLD E. PERRIN, *Secretary.*

#### World's Altitude Record Broken?

It is reported that the French pilot, M. Callizo, has beaten the world's altitude record by attaining an altitude of 12,060 m. (39,587 ft.) at Villacoublay, on October 10.

#### Maj. Zanni's World-Flight

MAJ. ZANNI, the Argentine world-flyer, has made further progress in his flight round the world on a Fokker-Napier "Lion" machine. He left Shanghai on October 9 and arrived at Kagoshima, in Japan. On October 10 he flew

another 300 miles to Kushimoto, and on the following day he arrived at the Kasumigaura naval air station, near Tokio.

#### A New Seaplane Record?

THE world's records for duration of flight for seaplanes have, it is claimed, been broken by the United States naval seaplane "C.S.2," which landed at Quantico, Virginia, after remaining in the air for 20 hrs. 28 mins. and having covered 1,500 miles at an average speed of 73 m.p.h.

# LIGHT 'PLANE AND GLIDER NOTES

*Those wishing to get in touch with others interested in matters relating to gliding and the construction of gliders are invited to write to the Editor of FLIGHT, who will be pleased to publish such communications on this page, in order to bring together those who would like to co-operate, either in forming gliding clubs or in private collaboration.*

In connection with the Lympe competitions the Air Ministry makes the following announcement:—

"The two-seater Dual Control Light Aeroplane Competition, which concluded at Lympe on October 4, has resulted in the production of new aeroplanes and engines of extreme interest and value from a practical and technical point of view. The aeroplanes, which were all widely divergent in design, proved themselves to be thoroughly efficient and satisfactory, and the power plant showed itself capable of carrying out all the tests prescribed, including the 10-hours' reliability test. On the other hand, it was found necessary to run the engines at such a high speed in order to secure the maximum competition performance, that a loss of reliability was the inevitable result.

"The Air Ministry is, therefore, reviewing the whole of the engine position with a view to obtaining the necessary technical data, free from the adverse conditions inherent in a competition of this nature.

"The Air Ministry considers that the results so far achieved warrant the formation of a small number of light aeroplane clubs, but does not feel justified in recommending the adoption of any existing types of dual control aeroplane for the use of such clubs until the engine question has been further explored. It will, therefore, be necessary for prospective members, or, in the case of clubs which are formed, the active members, to realise that some delay must unavoidably occur before clubs can be fully equipped. Those interested will be kept fully informed of developments in order that they can arrange their definite programmes as early as possible."

DOUBTLESS this announcement will cause considerable disappointment among those enthusiasts who had hoped to be able to make a start almost immediately after the Lympe competitions. Yet it can scarcely be claimed that the Air Ministry is going back on its word. It cannot be denied that the Lympe week showed that a great deal of development work still remains to be done before the engine question can be said to have been satisfactorily solved. Some of the engines at Lympe got through the week fairly well, and at least three individual engines gave relatively little trouble; at any rate, they but very rarely let the machines down outside the aerodrome. Even this small mead of reliability, however, was only attained by very careful nursing of the engines, and obviously there would be considerable risk of doing harm rather than good to the cause of light 'plane development if machines fitted with engines requiring such

care bestowed upon them were allowed to be handed out indiscriminately. It should be remembered that the Air Ministry is very directly interested in the light 'plane clubs contemplated, and that it is intended to subsidise a limited number of such clubs. The Air Ministry has, therefore, every right to insist upon certain precautionary measures being taken where the formation of light 'plane clubs and the purchase of "approved" machines are concerned.

On the other hand, there is the question of the private owner-pilot, who is not beholden to the Air Ministry for any direct financial support. His case should not be lost sight of, and here the Air Ministry will be well advised to place as few obstacles as possible in the way. Airworthiness certificates have, we believe, been granted most of the machines taking part in the Lympe competitions, and as the only engine which really gave satisfaction in the trials, the Bristol "Cherub," already possesses its airworthiness certificate, such machines as have been granted the C. of A. as far as they themselves are concerned will automatically be regarded as airworthy if fitted with this engine. Thus whatever its views on light 'planes for subsidised clubs, there would appear to be no grounds upon which the Air Ministry could refuse licences to private owners.

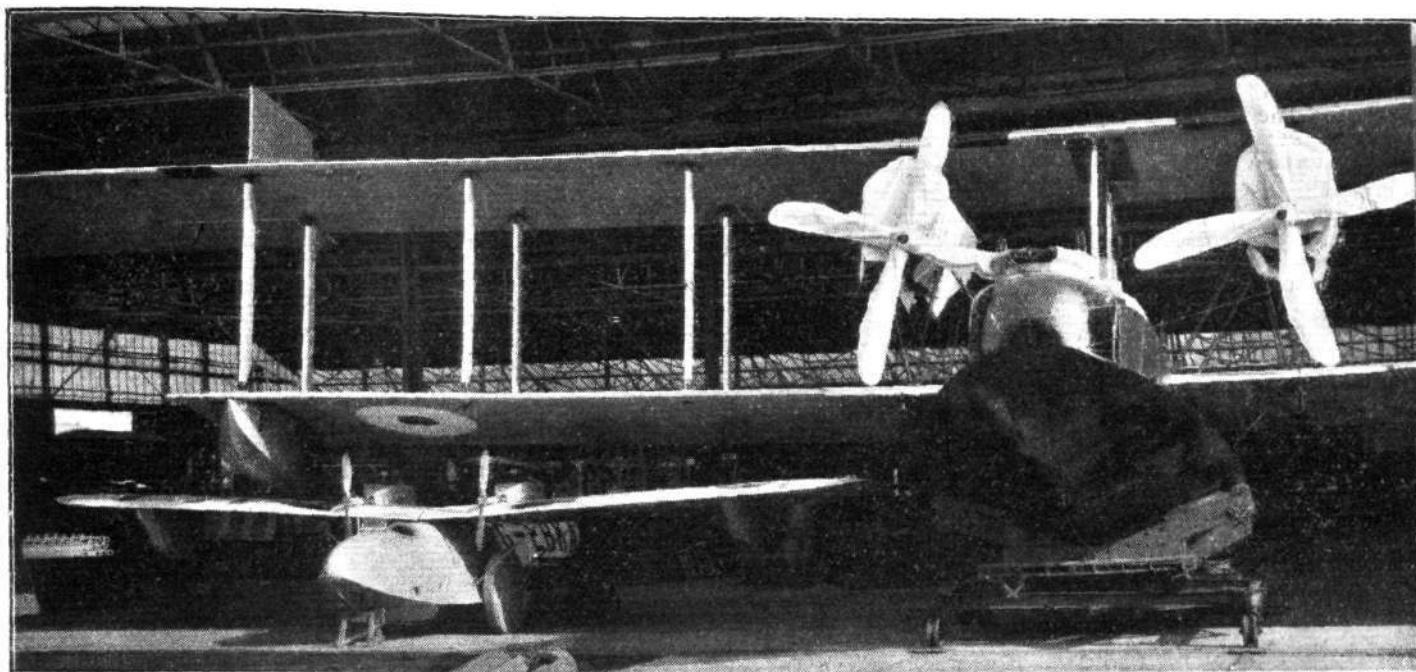
In the meantime the problem of the light 'plane engines will have to be tackled, and tackled immediately. There was no fault whatever to find with the Lympe machines themselves, and not a single one of those which failed to pass the eliminating trials did so owing to any defects in the machines. It is therefore obvious that the only thing which is now holding up light 'plane progress is the engine question. As we pointed out last week, there seems to be two ways open: either to decide to carry on with the development of the high-speed, high-efficiency engine of 1,100 c.c., or to allow a larger capacity, such as 2,000 c.c., and to limit the piston speed. We are not prepared to say which course of the two is likely to be the wiser, and it may be that both lines of development should be followed simultaneously. Both types have certain advantages and certain drawbacks. On the score of actual efficiency the high-speed engine is probably to be preferred. From the point of view of cheapness it seems likely, however, that the "slogger," the slow-speed, low-compression engine, would be more likely to give immediate advantages. Incidentally, it also seems likely that the latter type might require rather less care in running and in maintenance, and perhaps the most serious objection to this type of engine would be its rather extravagant fuel consumption.

In commercial aviation it has been fairly definitely proved that the high-efficiency low-weight engine is the one which comes nearest to making aviation a commercial proposition, but the case is rather different with light 'planes for private



**TOO LATE FOR LYMPNE:** The Blackburn "Bluebird" with Blackburne engine was not finished in time to take part in the recent two-seater light 'plane competitions.





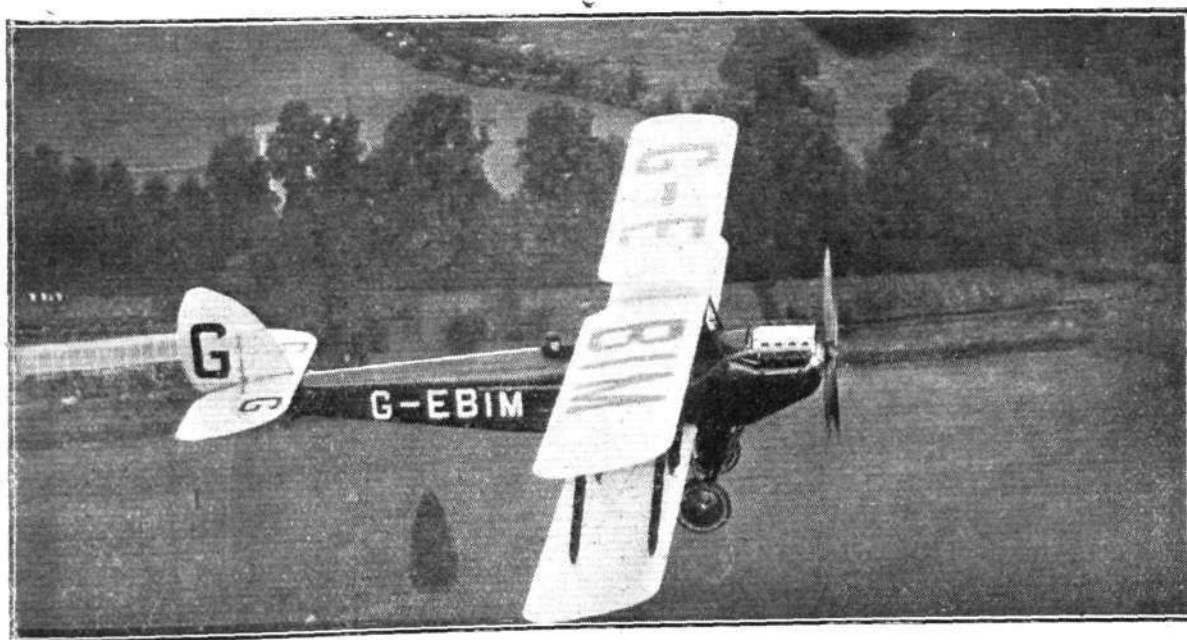
**DIGNITY AND IMPUDENCE ; or, the long and the "Short" of it : A study in contrasts. The small twin-engined Short light flying boat under the wing of an F.5 ; the smaller machine is to be tested this week.**

flying. Out of the total amount which the owner-pilot will have to spend on the upkeep and running of his machine, the petrol bill will probably be a fairly small percentage, while the difference in cruising range with the highly-efficient and the less-efficient engine will be of less importance than in the case of a commercial aeroplane. In the latter the difference in fuel consumption (fuel cost plus fuel weight to be carried) may mean the difference between profit and loss. In the light 'plane such considerations scarcely obtain, and other features might easily be of greater relative importance.

We should, personally, very much like to see certain experiments carried out to determine the suitability of the "slogger" engine for light 'plane work. One way of doing this, which should be very cheap, would be to obtain one of the old "Y"-type Anzani engines, used so extensively for school work before the War, and fit it in a modern light 'plane. If our memory serves, these engines weighed about 120 lbs., and developed 28 h.p. at 1,250 r.p.m. This power would scarcely be sufficient for a two-seater carrying the full load stipulated for the Lympne competitions, but they would in all probability fly a two-seater without the passenger quite satisfactorily. At any rate, if they don't, it seems to indicate that we have made no progress in aerodynamic efficiency since the days before the War.

WE still remember an occasion at Hendon when René Caudron flew his little biplane with "Jimmy" James sitting on one wing, just outside the nacelle. In order to balance the machine laterally a tool bag was tied to the inter-plane struts on the opposite side. We do not claim that the machine flew well with this load, but it flew—in spite of being a biplane braced with piano wire and having tail booms also braced with yards and yards of wire. Surely a modern and, it must be supposed, more efficient machine should fly reasonably well with the same engine. There must be a few of them still in existence if they can be discovered, and the experiment would be instructive. At any rate, the same model with small modifications, such as the substitution of mechanically-operated inlet valves in place of the automatic ones of the original engine, can, we believe, be purchased from the French Anzani firm for the purpose of the experiment.

BEFORE definitely settling the high-speed *versus* low-speed light 'plane engine question, such an experiment might be very illuminating. It should be remembered that the Blériot monoplane flew quite well with the 30 h.p. Anzani, and there must be many of our readers who still remember W. H. Ewen's flying on the Deperdussin monoplane with the same type of engine. Also there was Brock's memorable flight from Hendon to Brooklands in a gale, when, having



The D.H. 51 was much in evidence at Lympne, piloted by Mr. Barnard, and took up a number of distinguished passengers.

ascended from Hendon, he found himself unable to get back, and decided to "run before it," which he did, and arrived safely at Brooklands. If we have not improved our machines since those days, then the sooner we realise the fact the better, and one way of putting the matter to a practical test would be to fit a modern machine with the old engine. If it performed reasonably well there should be no difficulty in making a 2,000 c.c. engine running at somewhat higher revolutions, such as 1,700-1,800 r.p.m., and with modern valve gear, etc., fly a two-seater with full load. (The "Y"-type Anzani was, we believe, in the neighbourhood of 3,000 c.c.). The low speed should give good propeller efficiency without gearing.

In last week's issue of FLIGHT it was pointed out that a number of incidents and items in connection with the Lympne competitions had to be held over owing to lack of space, it being desired to give a full account of the actual results obtained. It is hoped that, although by now more than a week has passed, considerable interest still attaches to the doings at Lympne.

FIRST and foremost a word of appreciation should be said about the manner in which the Royal Aero Club carried out the organisation of the meeting. It will be realised that in the very nature of things there were many possibilities of friction due to misunderstandings in connection with the organisation. It speaks well for the manner in which the Royal Aero Club carried out its difficult task that so far as we were able to learn there was not a single complaint made by competitors. What with high-speed and low-speed tests, taking off and pulling up, etc., tests in which all competitors were to be allowed the same number of attempts, and the courses for which often had to be arranged at very short notice, it can be imagined that it was a most difficult matter to satisfy everybody. Yet, as we have said, we heard no single "grouse."

THE very greatest interest was shown in the competitions, not only by the Air Ministry, but also by the Royal Air Force. Air Vice-Marshal Sir Sefton Branker was present throughout the week, as was also Air Vice-Marshal Sir Geoffrey Salmond and Air Commodore Halahan. Air Commodore Brooke-Popham paid a flying visit to the competition and spent several days at Lympne.

Of distinguished visitors from abroad there were quite

a number, and the Air Attachés of foreign nations were interested spectators during most of the days. Capt. Victor Simonet, who has done so much to help forward the light 'plane movement in Belgium, was present and met many of the friends he made at last year's Lympne meeting. From Germany we had a visit by Herr Robert Thelen, one of the pioneer German pilots, and his friend Herr Schubert, chief designer to the Albatros company of Berlin. Altogether, it is safe to say that the meeting was followed very closely by representatives of most European countries.

ONE of the sights to which one came to look forward was the arrival every morning of Doctor Whitehead Reid. One day he would come over on his S.E.5 with R.A.F. engine and the next on his Avro 504k. He would make a split-air bank, a few Immelmans and a loop or two for good measure, and then alight. We wish there were a few more good sportsmen like the Doctor.

AFTER the Grosvenor Cup Race Cobham, on the D.H.53, gave a very pretty exhibition of vertical banks, while Longton, on the Hawker "Cygnets," did some "crazy-flying." The way in which he handled the light 'plane was wondrous to behold, and, watching it, one wondered how any pupil could possibly hurt himself on one of these machines. Doing all the things we were taught were wrong seemed to make not the slightest difference.

THE doping of light aeroplanes seems to present a problem in itself, and it is therefore all the more gratifying to be able to record that the general standard was high. Incidentally, a large proportion of the machines were doped with Cellon.

THE quality of the oil and petrol used during a competition of such a searching nature as that at Lympne is obviously of the greatest importance. It is therefore interesting to note that in the Grosvenor Cup Race "Shell" was used by the winner, Bert Hinkler, on the Avro "Avis," and by five more out of the nine machines which completed this difficult test. The British Petroleum Co., Ltd., inform us that they have received a letter from Mr. Maurice Piercey, who won first prize on the Beardmore "Wee Bee I," in which he states that "Every mark contributing to this success was scored on 'B.P.' Spirit." As regards oil, "Castrol" was used by Piercey (1st prize), Uwins (2nd prize), Comper (reliability test), and by every other machine that won any section of the competition.

## TWO BIG AIRSHIPS' FLIGHT

ON Sunday, October 12, the ZR3, the rigid airship built by the Zeppelin Co., at Friedrichshafen, for the American Government, started on its 4,500 mile voyage to Lakehurst, U.S.A. For several days previous to the actual start, it was announced that ZR3 would leave for America, but each time something or other caused a delay.

With Capt. Eckner in command, and with Capt. Steel and three American experts representing America, the ZR3, after final farewells all round, rose gracefully into the air shortly after 6 a.m., to the strains of "Deutschland über Alles" from a military band on the ground, and with garlands of flowers hanging from the gondolas. After circling Lake Constance, the airship steered a westerly course towards the Rhine. At 8.15 a.m., it passed over Basel at a height of about 1,000 ft., and half an hour later Capt. Eckner sent out a wireless message stating that they were then clear of cloud and were passing over Montbéliard, near Belfort. They passed over the Loire at 11.30 a.m. and by 3.30 p.m. they were crossing the mouth of the Gironde.

At this point, apparently, it was decided to take the southern route, via the Azores and Bermuda, for at about 4.30 a.m. a message was sent from the ZR3 stating that they were half-way between Spain and the Azores, and that everything was proceeding smoothly. Another message, timed 8.36 p.m., said that the airship was crossing Cape Ortegal, Corunna. The ZR3 passed over Horta, Azores, at 2.35 p.m., on October 13, flying at a speed of 66 m.p.h. Half an hour later a message was sent saying that they were 130 miles west of Fayal, Azores.

At the time of writing reports of the progress made by "ZR3," after passing the Azores are vague and scattered. However, on Tuesday it was reported that a storm was brewing in the North Atlantic and it was not certain what course the "ZR3" would take on the final stage of the journey in consequence. A wireless message from the airship received by the U.S. Navy Yard at 1 a.m. on Tuesday said:—"Passed Azores afternoon. Dropped bag personal mail from crew

by parachute as passed over village. Rose 5,000 ft. Running with three engines for economy. Making 48 knots, air speed. Following breezes, and heading for Lakehurst."

Later a message came through reporting that they were surrounded by thick fog and asking for compass bearings.

At 4 p.m. the "ZR3" sent a wireless message to Boston saying they had turned north for good weather, leaving fog and rain behind. They were going at a speed of 70 knots in the direction of Cape Sable (Nova Scotia).

The next report stated the "ZR3" was off Nova Scotia, making 65 knots, at 12.15 a.m. (Wednesday, October 15), at 4.20 a.m. the "ZR3" passed over Boston, and at 4.40 a.m. it flew low over Providence, Rhode Island. At 7.50 a.m. "ZR3," sailed over New York, where large crowds assembled, and shortly after arrived safely at Lakehurst, N.J. Thus, for the third time, the Atlantic has been crossed by airship.

Another big airship flight has been made during the past week, in this case, by the American-built rigid, "Shenandoah." On October 7, the airship, manned by a crew of 37 under the command of Commander Lansdowne, and filled with helium gas, left Lakehurst for a test flight of 7,000 miles to the Pacific Coast and back. It carried fuel and food for five days. Passing over South Carolina for Georgia, it arrived over Atlanta at 4.35 a.m., on October 8.

By noon the "Shenandoah" had crossed the Mississippi, and at 7.25 p.m., it arrived at Fort Worth, Texas, where it was moored to a mast for the night, and fresh supplies of helium taken in. The following morning the airship started off again, passing over Eastland, Texas, at 12.30 p.m. That night a gale sprang up, and the airship had a rough and alarming time crossing the Rocky Mountains. At one time it narrowly missed disaster, when it flew within 15 ft. of the top of Picacho Peak (Tucson). However, the "Shenandoah" arrived safely at San Diego at 10.28 p.m., on Friday, October 10. Whilst the airship was being moored, the rear gondola was damaged, so that the airship was forced to remain at San Diego for the time being until repairs were effected.



## THE AIR MINISTER'S TOUR OF IRAQ

LORD THOMSON, Secretary of State for Air, gave a long and glowing account of his week's tour of Egypt and Iraq, in an interview to the press on October 10. Leaving London on September 17, Lord Thomson and his party proceeded by old-fashioned methods to Alexandria, and on the 23rd he inspected the Royal Air Force units at Aboukir and Cairo. Next day, the 24th, they boarded Vickers Vernon aeroplanes and flew to Amman. The aerodrome there has hills on one side and ravines on the other, which makes it difficult for a large aeroplane to land there; so the Vernons came down at Ziza, which is 18 miles off, and the party transferred into D.H.9a's and flew into Amman. That night Lord Thomson dined with the Amir Abdullah, ruler of Transjordan, and brother of King Ali of the Hedjaz and King Faisal of Iraq.

On Thursday, the 25th, the D.H.9a's took the party back to Ziza, where they boarded their Vernons and flew on for over 500 miles across the desert to Baghdad, making a halt for petrol at Ramadi. Lord Thomson said that he found the comfort of travel in a Vernon simply astonishing. They flew mostly at from 5,000 to 6,000 ft., keeping above the bumps caused by the hot air rising from the desert. It may be remembered that a couple of years ago it was said that if one flew high enough to get above the bumps, the track across the desert, which was merely the track of the wheels of a convoy of cars, became invisible. Now this guiding line has evidently been improved, for Lord Thomson said that it was clearly visible.

"I have never," said Lord Thomson "seen anything finer in the world than the escort of Vernons which came out to escort us from Ramadi to Baghdad." In all, there were nine Vernons in the air, and they all landed simultaneously on the aerodrome at Baghdad.

September 26 was spent aground, in a round of visits and inspections in the capital. A point which Lord Thomson stressed was that, though he is not a strong man, he felt absolutely no fatigue after travelling by air; and he would alight quite fresh from his aeroplane, inspect guards of honour and go on to official duties and interviews.

Next day the party embarked on D.H.9a's for a tour in the northern province of Mosul. They reached the provincial capital and inspected the local levies and units of the Arab army. In the afternoon the Air Minister met the notables of the city, men of three religious sects—Syrian Christians, Roman Catholics, and Mussulmans. On the 28th they flew on to Zako, the area where there has lately been trouble with the Turks, and then turned up the valley of the river Zab to Amadie, where the Iraq-Turkish frontier is somewhat undefined. The inhabitants there are Syrian Christians. On the return journey, when they had left Zako about half an hour, a flying wire on Lord Thomson's machine broke. He mentioned this with some emphasis because it was the only mishap which occurred throughout the tour. The pilot turned back to Zako ("so as not to risk the neck of a politician" said Lord Thomson), and the repair was effected in about a quarter of an hour. Then on they went to Erbil (the Arbela where Alexander the Great finally overthrew Darius the Persian), and had a chat with the political officer. That was the morning's work. In the afternoon they came out to the west of the hill country and landed at Kirkuk. Here Lord Thomson saw one of the best mounted cavalry regiments he had ever seen in all his experience as a soldier. It was an Arab regiment commanded by a Col. T. B. B. Lawrence, V.C., late of the 17th Lancers who won his cross in the South African war 24 years ago.

The air over the Mosul hills is rather subject to pockets,

but Lord Thomson, who admitted himself a bad sailor, said that he did not have a moment's discomfort. But when he landed, he did regret the translucent altitude he had left. Coming down into the burning heat of the desert made him rather giddy.

On the 29th the party went on to Sulaimanie, near the Persian frontier, and this visit was a particularly impressive incident. Before the War this was a town of some 20,000 inhabitants, lying on the caravan route to Persia, and the home of many rich merchants of Persian extraction. Then the disturbed times came, and the population shrank to 700. The rest became refugees, and Lord Thomson drew a moving picture of what their sufferings must have been. But when his aeroplane landed there were about 1,500 people on the aerodrome to see it. There an imposing procession was formed, with Lord Thomson on horseback, and they rode round the bazaar for half an hour, until the head of the procession caught up its own tail. The reception was quite enthusiastic.

After the reception Lord Thomson received three deputations in turn—one from the Arab Shaikhs, the second from the Mayor and City Fathers, and the third from the merchants. The Air Minister received them alone except for the unavoidable presence of an interpreter. They asked for no boons, which is rather surprising when Asiatics have got face to face with "The Presence." The tenor of their remarks was gratitude for the restoration of law and order—and that has chiefly been restored by the Royal Air Force. The merchants in particular stressed the fact that they were now free from robbery. Here Lord Thomson digressed to remark with great seriousness that this happy state of affairs had not been brought about by bombing the lawless. Bombing was a rare occurrence, undertaken reluctantly and with careful consideration. When it had to be employed, an aerial bomb was far less indiscriminating than an artillery shell. But the influence of aircraft—"this unknown weapon, this all-seeing eye"—and the swiftness of its action, when action had to be taken, had restored Sulaimanie from defestation to prosperity. The town now boasts 12,000 inhabitants.

From Sulaimanie Lord Thomson flew back to Baghdad, and this eventful day closed with a formal dinner given by King Faisal. Some of the places he had visited were all but inaccessible in a motor-car.

On September 30 the return journey across the desert was commenced. Lord Thomson described something of the organisation of this airway with its 20 to 30 landing-places and the concrete petrol tanks buried in the sand with just a small dome and a locked metal plate showing above the surface. They stopped at Amman that night, and next day landed at Ralmeh to enable Lord Thomson to visit Sir Herbert Samuel on the Mount of Olives, where Lord Thomson had once had his own headquarters. On October 2 a start was made at 4 a.m., the Vernons being escorted by Bristol Fighters. They reached Heliopolis outside Cairo in time for an early lunch, and then flew on to Aboukir, where four Egyptian Ministers were interviewed. "From there," said Lord Thomson, "I returned to a far less peaceful atmosphere."

Throughout the tour the organisation was masterly, and they were never behind their time-table, though sometimes ahead of it. The pilots in every place aroused his greatest admiration, and he also spoke warmly of the mechanics, whose work had made it all possible. He had flown 2,599 miles in eight days, and he had thoroughly enjoyed his whole journey.

### U.S. Airship TC 2 Wrecked

Whilst manœuvring over Langley Field, Virginia, the U.S. Army airship TC 2 met with a curious accident. A bomb it was carrying exploded, tearing a hole in the envelope and causing the airship to fall from a height of 150 ft. The crew of five had not time to escape by means of their parachutes, and fell with the airship, which, owing to the fact that it was filled with helium, did not catch fire. Fortunately there was no loss of life, but all were more or less badly hurt.

### Capt. D'Oisy Honoured.

CAPTAIN PELLETIER D'OISY, and his mechanic, Adjutant Besin, the heroes of the record long-distance flight from Paris to Tokio, were formally received at the Hotel de Ville on Tuesday afternoon in the presence of an enormous crowd of

invited guests. After the two airmen had signed the Livre d'Or of the City, the President of the Municipal Council handed D'Oisy the gold medal which Paris presents to those she honours, a replica in silver being bestowed on his mechanic.

### Boy Scouts and R.A.F.

THE secretary of the Boy Scouts' Association desires it to be known, in view of statements which have appeared in some papers recently, that no scheme of affiliation between the Royal Air Force and the Boy Scouts' Association has been arranged. The committee of the association has, however, for a long time endeavoured to interest Boy Scouts in aviation, especially on the civil side, by instituting a badge for this purpose.

## ANOTHER BRISTOL "JUPITER" RELIABILITY TEST

On the bench the 400 h.p. "Bristol" Jupiter air-cooled radial engine has carried out a series of tests demonstrating its reliability and durability with such success as to satisfy the most fastidious of critics. Twice it has carried out the schedule of type tests covering 52 hours' running as laid down by the British Air Ministry. Twice in France the Jupiter engine has carried out a similar series of tests to the full satisfaction of the French authorities. More than a year ago it successfully completed an endurance test of 150 hours in this country under the supervision of the A.I.D.; this included a 50 hours non-stop run, and a strip down at the conclusion of the test showed no more than 0.0005 of an inch wear on any major part. More recently a very similar test of 150 hours duration was completed in France for the French Government, a report of which was given in our issue of FLIGHT for October 2 last.

In order to further demonstrate the reliability, durability, and ease of upkeep of the "Bristol" Jupiter engine and its special suitability for Civil Aviation, a series of trials under the most searching conditions, totalling 150 hours' flying, have recently been completed. The engine was fitted in the "Bristol" Freight Carrier, which, when loaded, totalled to 6,200 lbs. in weight, so that it was necessary to cruise at over 90 per cent. full throttle. By the installation scheme adopted the cylinder and crankcase temperatures were also higher than under normal test-bed or flight conditions. From an engine standpoint this combination of adverse circumstances ensured a very thorough test.

The engine used was a standard production Series IV Jupiter engine No. 922. The usual three hours' official bench test was carried out, and after installation in the machine 17 hours' flying was carried out in aircraft test flights, full-throttle climbs to try out the cooling, certificate of airworthiness tests, etc. On July 19, 1924, the machine was taken over by Imperial Airways, Ltd., for operation as a freighter on their Continental air routes.

The first flight in this service was made on July 22, and the engine remained in the service until the completion of 150 hours' running on August 23, when, in accordance with the original arrangements, it was removed and stripped for detail examination. During the flights the machine was flown by various pilots drawn from the Imperial Airways Reserve,

all of whom are making their first acquaintance with this type of engine. Throughout the tests standard oil and fuel were used.

Flights were made on 21 days, the longest daily period being 9½ hours. Over this period the average consumptions were 24.8 gallons per hour of petrol and 1.1 gallons per hour of oil, the average engine speed being 1,580 r.p.m. After the engine had run 144 hours a forced landing was made near Cologne owing to failure of the oil supply following a fracture of the oil pipe to the pressure gauge.

The total replacements to the engine on service were two outer exhaust valve springs and a stub exhaust pipe. With regard to installation, there was the above-mentioned fracture of the oil pipe to the pressure gauge, whilst the oil pipe from the scavenge pump was found to be broken at the brazed joint.

After removal from the machine the engine was completely stripped for examination in the workshops of Imperial Airways, Ltd. As emphasising the simplicity of the Jupiter and care of dismantling, it should be mentioned that the complete strip was completed by three mechanics in three hours, a total of nine man hours, and rebuilt in 19 hours. Several piston rings were accidentally broken in removal through lack of proper tackle, and the only other replacements were three inlet rocker buttons and a connecting rod complete with white metal bush. Though the bush was still serviceable the opportunity was taken for its replacement, as cracks in the white metal were detected. The general condition of the engine was excellent, the bearings and working parts showing a minimum of wear.

When one fully reviews the circumstances under which the trials were carried out, it is realised that it is one of the most severe to which any engine, either air or water-cooled, has ever been submitted. Run at nearly full throttle throughout the whole period by pilots who were frequently changed and whose unfamiliarity with the engine did not allow of that "humouring" which often means so much to an aero engine, the conditions were most unfavourable, but lend even greater point to the report of Imperial Airways, Ltd., that "The general performance of this engine has been very satisfactory, and little has been required in the nature of repairs and replacements."

## ROYAL AERONAUTICAL SOCIETY

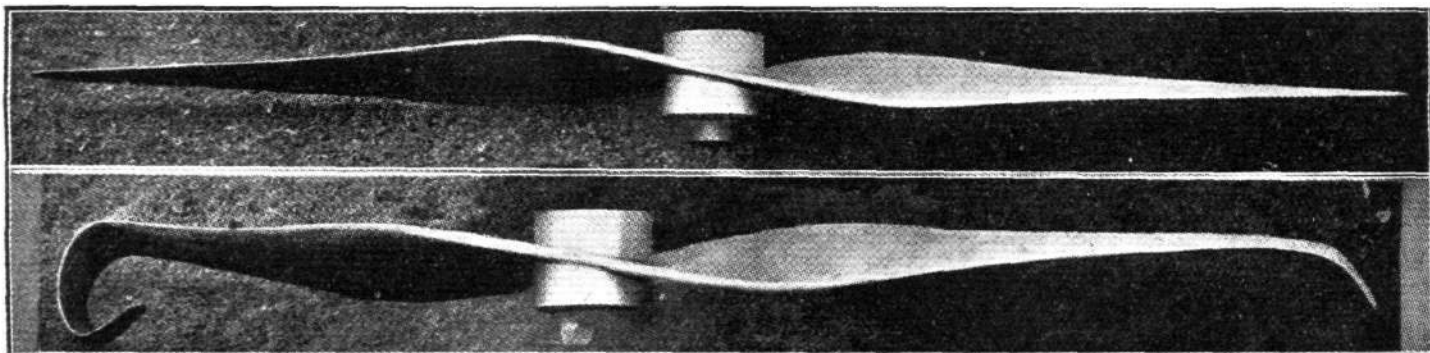


*Lecture.*—The next fortnightly meeting of the Royal Aeronautical Society will be held at the Royal Society of Arts, 18, John Street, Adelphi, W.C. 2, at 5.30 p.m., on Thursday, October 16, when Dr. Rohrbach will read a paper on "Large All-Metal Seaplanes."

Dr. Rohrbach is a German Doctor of Engineering, who, during the War, was connected with the design of Zeppelin airships. He subsequently turned his attention to aeroplanes, and was responsible for the Zeppelin "Staaken"

monoplane with engines in the wings, which aroused considerable interest just after the War. After its trial flights this machine was destroyed on the instructions of the Inter-Allied Aeronautical Commission of Control as contravening the terms of the Peace Treaty. Since leaving the Zeppelin firm Dr. Rohrbach has formed a company of his own which has developed all-metal seaplanes constructed of "Duralumin," the English rights for which have lately been obtained by William Beardmore and Co., Ltd.

W. LOCKWOOD MARSH, Secretary



**ONE FOR THE METAL AIRSCREW:** We reproduce above, two interesting photographs which demonstrate, graphically, the extraordinary qualities of the Curtiss-Reed metal airscrew—known in this country as the Fairey-Reed, the Fairey Aviation Co., Ltd., being the British representatives of this "prop." The airscrew shown above was involved in a crash at Pensacola, with the result depicted in the lower view. Instead of scrapping it, an attempt was made at straightening the damaged blades. This was successfully accomplished as shown in the top view, and when finished it proved to be "as good as new."



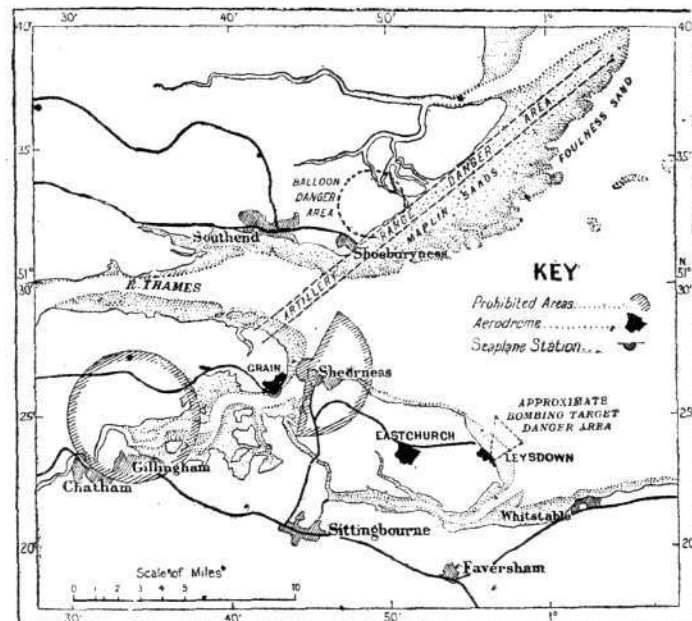
## NOTICES TO AIRMEN

**Thames Estuary : Danger Area**

It is notified :—

1. Artillery practice which takes place at the Yantlet and Shoeburyness ranges constitutes a danger to aircraft over an area extending across the mouth of the Thames from Yantlet (latitude  $51^{\circ} 28' N.$ , longitude  $0^{\circ} 42' E.$  approx.), about three miles north-west of Sheerness, to the north-east extremity of Foulness Sand (latitude  $51^{\circ} 40' N.$ , longitude  $1^{\circ} 5' E.$  approx.). The position of the ranges is shown on the appended plan.

2. Firing takes place practically every day at Shoeburyness, and/or Yantlet, including days when the clouds are low.



No aircraft signal is displayed at Grain aerodrome or elsewhere when firing is in progress, and paragraph 5 of the By-laws for the Yantlet (Grain Island) Artillery Range should be read as if modified accordingly.

3. In view of the danger to which aircraft flying over the ranges are exposed, pilots should invariably keep at a safe distance from the area. Aircraft approaching the Thames Estuary from the east and south-east should proceed to the south of the prohibited areas of Sheerness and Hoo, or if approaching from the north-east, to the north of Foulness Sand (and vice versa).

4. No liability for accidents arising to aircraft from the use of the ranges will be admitted.

5. *Previous Notices.*—Notice to Airmen No. 51 of 1922 is hereby cancelled. The references to Notice No. 51 of 1922 in Notices Nos. 61 and 73 of 1922 should be amended so as to refer to the present Notice.

(No. 78 of 1924.)

**Uruguay : Ratification of the International Air Convention.**

THE Government of the Republic of Uruguay having deposited its ratification of the International Air Convention on July 13, 1924, the Convention came into force for Uruguay, in respect of the Contracting States, on August 22, 1924.

(No. 83 of 1924.)

**Changes in Visibility at Meteorological Stations on Aerial Routes**

1. SPECIAL reports of changes in visibility at Croydon, Biggin Hill and Lympne will be issued when the horizontal visibility :

(a) is decreasing and becomes less than 1,000 metres (or 1,100 yards) ;

(b) decreases still further, and becomes less than 200 metres (or 220 yards) ;

(c) after having been less than 200 metres (or 220 yards), improves and has become greater than 500 metres (or 550 yards) for at least 10 minutes.

2. These reports will be exhibited at the aerodromes of Croydon and Lympne, and will be communicated immediately by R/T from these aerodromes to the pilots of aircraft in flight who may be affected.

3. The reports will also be transmitted immediately by W/T to the terminal aerodromes at Amsterdam, Brussels and Paris, in the following code :—

(a) The word "fog."

(b) Four figures indicating the time (G.M.T.) at which the phenomenon was observed.

(c) The name of the station in clear.

(d) The first group of the abbreviated code for hourly route reports. (The first group contains the information required to complete the form in Notice to Airmen No. 80 of 1922 and also in Notice No. 138 of 1922, Part I, Section III, paragraph 4.)

4. Similar messages will be transmitted from Brussels with regard to visibility observations at the aerodromes of Haren and Ostend and at the Royal Meteorological Institute at Uccle. These messages will be exhibited at Croydon and Lympne, and when necessary will be communicated by R/T to aircraft from these stations.

(No. 91 of 1921)

**International Aeronautical Maps : Britain**

1. THE Britain General Sheet (provisional), G.S., G.S. (Air) 113, of the International Aeronautical Maps, prepared in accordance with Annex F. of the International Air Convention, is now on sale. The map is drawn on Mercator's Projection to a scale of 1 degree of longitude equals 3 centimetres.

The area covered is : Latitude  $47^{\circ} N.$  to  $61^{\circ} N.$  ; longitude  $14^{\circ} W.$  to  $2^{\circ} E.$

2. Copies of this map may be obtained through the following agents (price 4s. (paper) and 4s. 6d. (linen backed)) :—

London : E. Stanford, Ltd., 12, Long Acre, W.C. ; Sifton Praed and Co., Ltd., 67, St. James Street, S.W. ; T. Fisher Unwin, Ltd., 1, Adelphi Terrace, W.C.

Edinburgh : W. and A. K. Johnston, Ltd., Easter Road.

Liverpool : Philip, Son and Nephew, 20, Church Street.

(No 97 of 1924.)

**Rules for Flight over Air Routes**

It is notified the following should be substituted for paragraphs 1 (c) and (d) of Notice to Airmen No. 42 of 1924 :—

"(c) When a pilot decides to follow an officially recognised route he should bear in mind that the risk of collision with another aircraft following the same route is considerable. Every pilot following such a route, therefore, shall endeavour to keep it at least 300 metres on his left.

"When a pilot is following a line of ground marks such as a road, railway, canal, river, etc., not forming part of an officially recognised route, he is advised to keep such a line of ground marks to his left for a similar reason.

"(d) Every pilot who decides to cross an officially recognised route, whether he has been following it or not, shall cross it at right angles and as high as circumstances permit.

"Should he desire, after crossing it, to fly in a direction parallel to the route, but keeping it on his right, he must keep sufficiently far from the route to avoid aircraft following it in the normal way.

"A pilot who decides to cross a line of ground marks he is following that do not form part of an officially recognised route is advised to observe the same precautions."

(No. 101 of 1924.)

**London-Brussels and London-Amsterdam : Officially Recognised Routes**

It is notified :—

1. The British, French, Belgian and Netherlands Governments have agreed that the officially recognised air route for aircraft flying along the coast between Calais, Ostend and Nieuwe Sluis Lighthouse (at the mouth of the Scheldt—Latitude  $51^{\circ} 24' N.$ , Longitude  $3^{\circ} 30' E.$ ) shall be the water line (i.e., the actual water line at any time).

2. The officially recognised air routes London-Brussels and London-Amsterdam are now defined as follows :—

(A) *London-Brussels, Southern Route.*

Between Croydon and Oxted—No official route ; Oxted and Folkestone—The main railway line through Edenbridge, Tonbridge and Ashford ; Folkestone and Calais—No official route ; Calais and Brussels (Haren)—The main railway line through St. Omer, Hazebrouck and Armentières to Lille. The main road from Lille through Tournai, Ath and Hal.

*Note.*—The Franco-Belgian frontier on the southern route must be crossed between Armentières and Baisieux.

(B) *London-Brussels, Northern Route (via Ostend).*

Between Croydon and Calais—As in (A) ; Calais and Ostend—Water line (i.e., the actual water line at any time) ; Ostend and Brussels—The main railway line through Bruges, Aeltre, Ghent, Erpe and Denderleeuw.

(C) *London-Amsterdam.*

Between Croydon and Calais—As in (A) ; Calais and Nieuwe Sluis Lighthouse—Water line (i.e., the actual water line at any time) ; Nieuwe Sluis Lighthouse and Amsterdam—As stated in Notice to Airmen No. 8 of 1924, paragraph 2 (1).

(No. 102 of 1924.)

# ROYAL AIR FORCE ARMY CO-OPERATION

## Divisional Training at Aldershot

OUR readers will understand that the Lympe meeting put a strain upon our space in recent issues, but now that the eventful week is past we make no apology for devoting attention to the part played by the Royal Air Force in army divisional training at Aldershot last week. And we may take as our text an article by Lieut.-Col. Repington, which appeared in the *Daily Telegraph* of September 26. Col. Repington gives us the impression of one who has a sentimental attachment to the old order of things, a feeling at which we should be the last to scoff—for what British soldier does not in his heart of hearts regret the days of pike and claymore, and feel something of the prejudice expressed in the term "villainous saltpetre"? So we do not resent the apparent satisfaction with which Col. Repington records that during the manoeuvres "high winds, driving rain, and lowering clouds, some 300 ft. above the ground on more than one occasion, prevented the airmen from executing their mission," or the inference which he draws that an air force does not and cannot compete with cavalry for protective reconnaissance. The passing of the cavalry would indeed be a tragedy of modern military developments, and if the weather of western Europe makes room for cavalry as well as aeroplanes in modern warfare, no fighting man will regret it.

In fact, this bent of Col. Repington's mind makes all the more striking the very high testimony which he pays to the work of No. 4 (Army Co-operation) Squadron during the manoeuvres. He appears to have been quite startled at its efficiency, and he is fair, even generous, in the way in which he records his amazement. One other little point in the article increases the value of his testimonial—namely, his ignorance of R.A.F. matters. He writes of Squadron-Leader C. H. B. Blount, O.B.E., M.C., who commands No. 4, as "Squadron-Commander Blount," and he confesses himself no judge of types of aeroplane.

The 4th Squadron (which is equipped with Bristol Fighters) supplied the superior air force against which each division in turn had to contend, and also provided a small flight for each division. The bombers came from other units. On the two days on which the weather in the early mornings handicapped the airmen—though on actual service we very much doubt if clouds 300 ft. above the ground would have completely incapacitated them, despite the grave risk of casualties—the incapacity only lasted for a few hours. As the day wore on "the airmen affirmed their watchfulness and their power." Squadron-Leader Blount was enabled by their reports to plot out on his map the greater part of the enemy's dispositions, so that the general character, direction and strength of the attacks became clear. Col. Repington was fascinated by the way in which this was done. A large scale map was spread on a table and covered with glass. As the reports came in each new disposition was marked in black on the glass, and the former position was easily erased. Two staff officers of the army sat by the squadron-leader to interpret the developments and report to the divisional general, and, says Col. Repington, "watching the gradual revelation of the enemy's movements, position, and intentions, as shown on the map as it grew, was extraordinarily interesting. . . . It is nearly as weird and uncanny as the control station at

headquarters during a Zeppelin raid on London." Thus, in the eyes of a critic, by no means prejudiced in favour of the newest arm, the reconnaissance work of the Royal Air Force was amply justified.

Nor was Col. Repington less impressed by the striking power of the aeroplanes. On one day a supply column consisting of 36 lorries was located by an aeroplane with wireless near Frensham pond at 4.27 p.m. Only 21 minutes later the column was attacked by four Bristol Fighters and was broken up. "The rapidity with which this was done was startling." On another day a column of 63 wagons near Alice Holt wood was similarly destroyed. "These were highly unpleasant experiences for the army." But worse was to follow. A whole artillery brigade was caught on a road, and the aeroplanes flew up and down above it, swooping down in turn to rake the column from stem to stern with a continuous stream of fire. The bombers also attacked towns and divisional railheads far in the rear, and Col. Repington thinks that bombers flying in formation and well armed with machine guns "are not attractive to attack by air." Col. Repington admits that "the superior air force, given weather possible for flying, exercises a predominance over the whole of the rearward communications of a moving army, and it is dangerous and difficult for any wheeled column to operate at all except by night or through woods."

Col. Repington also notices the versatility with which the airmen discounted a disability inherent in their weapon. They did not attack extended infantry, or guns with shields, with their machine guns. To be effective against such targets, it is well known that small arm fire must be what is known as "grazing" fire—that is to say, the trajectory must be more or less parallel with the surface of the ground. Shots fired from an altitude are called "plunging fire," and when a shot misses the individual target it has very little chance of hitting another. On such occasions the airmen turned their own artillery on to the target, and shrapnel did the work which machine guns in the air could not do.

Col. Repington is quite nonplussed when he contemplates the changes in army tactics which are imposed by the new arm. Headquarters must not be situated at cross roads—the most suitable place for them—and must be carefully concealed; infantry must be taught to take cover on the shady side of hedges and trees to escape the eye of the aerial camera, etc. Quite rightly he sees that the only effective reply to air attack is the provision of a superior air force. Apparently, in the manoeuvres which he describes, the bombing and reconnaissance aeroplanes were not subject to the attacks of hostile fighters and scouts, and consequently did not need fighting escorts. This immunity made the air operations unreal. Mastery of the air, or at least freedom of the air, must be asserted by the fighting aircraft before the bombers and reconnaissance machines can do their work. But were the whole of air warfare to be practised at army manoeuvres the umpiring business would be exceedingly difficult; and while it was under consideration whether a supply column had been destroyed or whether the bombers had previously been shot down by hostile Siskins, poor Tommy would be apt to grow very hungry.

## Personals

### Married.

Captain J. E. DOYLE, D.F.C., was married, on October 7, at Zeal Monachorum, to GRACE VERA BURD, youngest daughter of Dr. and Mrs. G. V. Burd, of Okehampton.

The marriage took place at Belhaven Church, Glasgow, on Wednesday, of Flight-Lieut. C. E. WILLIAMSON-JONES, D.F.C., R.A.F., London, to HELEN ELIZABETH, younger daughter of Mr. and Mrs. ANDREW MACLELLAN, of 4, Belhaven-Terrace, Glasgow, W.

The marriage took place, on October 14, at St. George's District register office, Prince's Row, of Air-Commodore CHARLES RUMNEY SAMSON, C.M.G., D.S.O., and Miss WINIFRED REEVES, eldest daughter of Mr. and Mrs. Herbert K. Reeves, of The Mansion, Leatherhead.

### To be Married

The engagement is announced between Lieut. WILLETT AMALRIC BOWEN-BUSCARLET, R.A. and R.A.F., son of Mr. and Mrs. F. C. Buscarlet, of Newcastle-on-Tyne, and VIOLET MARY, daughter of the late Mr. JOHN MONTHERMER MONTAGUE and Mrs. Montague, of Broom Hill, near Barnstaple.

The marriage of Squadron-Leader P. C. SHERREN, M.C., R.A.F., and Miss JOYCE TILDEN SMITH will take place quietly at St. Mark's, North Audley Street, on October 29, at 2.15.

### Killed

STANLEY EDWARD HALL, R.A.F., was killed on September 22, whilst flying at Abu Sueir, Egypt. His age was 25.



# THE ROYAL AIR FORCE

London Gazette, October 7, 1924

## General Duties Branch

Flying Off. W. F. Dry is granted permanent commn. in rank stated (Oct. 8); Pilot Off. H. P. Morris is promoted to rank of Flying Off. (Aug. 13); Pilot Off. C. L. Moores is removed from the R.A.F., His Majesty having no further use for his services (September 30).

## Stores Branch

Flying Off. E. A. Burrage is granted a permanent commn. in rank stated (Oct. 8). The follg. Flying Offs. are granted permanent commns. for accountant duties in rank stated (Oct. 8):—R. T. Carter, C. W. Price.

## Medical Branch

D. Magrath, M.B., is granted a short service commn. as Flying Off., with effect from, and with seny. of, Sept. 24. The follg. Flight Lts. are transfd. to Reserve, Cl. D.2.:—R. G. J. McCullagh (Oct. 4); C. Y. Roberts (Sept. 21).

## Reserve of Air Force Officers

The follg. are granted commissions on probation in the General Duties Branch, in the ranks stated (Oct. 7):—

CLASS A.—*Flying Officers*:—R. H. Mayo, O.B.E., P. Smallwood. *Pilot Officer*:—F. G. Sinclair.

CLASS B.—*Flying Officers*.—W. Allan. Flying Officer C. T. Robinson is confirmed in rank (Feb. 1).

The follg. are transferred from Class A to Class C:—*Flying Officers*:—E. N. Fenton (April 26); C. E. Jessell (Oct. 3); J. Baird, A. J. Bott, M.C., A. Mackenzie (Oct. 7). *Pilot Officers*:—C. L. Atkinson, G. C. H. Dorman, C. A. McIntosh, C. Wilson (Oct. 7).

## Memoranda

W. J. Root is granted temporary commn. as Flying Officer for duty with Electrical Services Works Co. under Directorate of Works and Buildings (Sept. 30). The permission granted to Lieut. E. R. Ortner to retain his rank is withdrawn on his enlistment in the Army (Aug. 18).

## ROYAL AIR FORCE INTELLIGENCE

**Appointments.**—The following appointments in the Royal Air Force are notified:—

### General Duties Branch

*Flight Lieutenants*.—H. V. German, to Reception Depot, West Drayton, on transfer to Home Estab.; 28.10.24. G. E. Gibbs, to No. 14 Sqdn., Palestine; 29.8.24. C. T. Anderson, D.F.C., to No. 2 Flying Training Sch., Digby, on transfer to Home Estab.; 19.9.24. Y. M. Yool, to No. 11 Sqdn., Netheravon, on transfer to Home Estab.; 10.10.24.

*Flying Officers*.—C. Walker, to Boys' Wing, Cranwell, on transfer to Home Estab.; 17.10.24; A. Neeson, to R.A.F., Depot on transfer to Home Estab.; 12.10.24. L. A. C. Stafford, to Inland Area Aircraft Depot, Henlow; 2.10.24. T. McM. Shields and A. F. McC. Riggs, to R.A.F., Depot; 1.10.24.

### Stores Branch

*Squadron Leader*.—P. J. Wiseman (Accountant), to Command Accounts Office, Palestine; 23.9.24.

### Medical Branch

*Flying Officers*.—C. J. MacQuillan, M.B., B.A., and F. P. Schofield, M.B., to R.A.F., Depot; 6.10.24.

### Chaplains' Branch

Rev. G. L. Robinson, D.S.O., to No. 4 Flying Training Sch., Egypt 30.9.24.

## Speeding-Up South American Mails

It is reported that surveys have recently been completed and final preparations are now being made for a scheme whereby urgent letters carried between London and Buenos Ayres will be considerably accelerated during their 7,000-mile journey, mainly through the agency of aircraft. After a first stage of 105 miles an hour in a Napier D.H. air express along the Imperial airway from London to Paris, the mails will go by night express train to Toulouse. Here they will be transferred to powerful, multi-engined mail planes and flown 560 miles to Algeria. From Algeria other planes will carry them 1,500 miles to Dakar, in the French West African colony of Senegal. At Dakar they will be put aboard a fast mail steamer, and borne 1,800 miles across the South Atlantic to Pernambuco, in South America. Awaiting them at Pernambuco will be a big, swift-flying boat, which will carry them over a final stage of 2,300 miles to Buenos Ayres. This combined land-sea-air mail will, it is reckoned, reduce by practically one-half the time taken by ordinary methods of despatch.

## Commercial Airship Design

COMMANDER F. L. M. BOOTHBY, C.B.E., is reading a paper under above title before the Institution of Aeronautical Engineers on Friday, October 17. The meeting will take place at the Engineers' Club, Coventry Street, and will commence at 8.30 p.m. Sir Charles Bright will be in the chair. In view of the special interest taken in airship work at the present time, the lecture should be attended by all who can possibly manage to be present, and we believe tickets may be obtained upon application to the offices of the Institution, 60, Chancery Lane, London, W.C.2. Commander Boothby's work in connection with airships is well known, and he is one of the most enthusiastic airship experts of the present day. His paper will, we understand, contain detailed references to such very important subjects as the use of exhaust gases for protection against fire, the substitution of heavy-oil engines for petrol engines, and economy in fuel by using hydrogen in conjunction with heavy oil in the ordinary engine. The paper should be of particular value to those who have not made a special study of the problems with which the airship designer is confronted.

## Paris—Tunis and Back.

Two French military airmen, Lieutenant Charles and his mechanic, returned to Le Bourget on October 18, after having made a remarkable flight of 5,000 miles from Paris to Tunis, via Rabat and Algiers and back. They started from Paris on September 30, but did not reach Tunis until October 7 owing to bad weather conditions. They began their return flight last Thursday, and expected to reach Paris on Saturday night, but were delayed owing to the shortness of flying time occasioned by the early nightfall at this time of the year. The machine used had been in constant use in army flying squadrons since 1917, and made the journey without the slightest preparation.



**THE RICKENBACKER TROPHY:** The above handsome figure, which is in bronze, 31 ins. high, and was designed by Miss Josephine Kern, is the trophy presented by Capt. E. V. Rickenbacker (the American Ace) for the light aeroplane contest held at the close of the International Aviation Meet at Dayton, October 6. The contest was a cross-country one, non-stop from city to city. The results of this competition, however, are not yet to hand.

## IN PARLIAMENT

### Aeroplane Accidents and Compensation for British Army Officers

LIEUT.-COLONEL POWNALL, on October 8, asked the Secretary of State for War whether officers of the Army who proceed on duty in aeroplanes are treated, as regards compensation in case of mishap, similarly to officers of the Royal Air Force; and what provision is made for their dependants in the case of death?

The Secretary of State for War: Army officers ordered to proceed on duty in aeroplanes are treated, in case of mishap, under the Regulations for disabilities arising during Army service, unless they are seconded to the Royal Air Force and paid at Royal Air Force rates, in which case they are dealt with under the Royal Air Force, or Army Regulations, whichever are more favourable. The Army and Royal Air Force Regulations differ in detail, but, taken all round, give similar results. Pensions, gratuities or allowances are granted to widows, children or dependants of officers who die as the result of being ordered to fly on duty under Regulations which are substantially the same in the Army and the Royal Air Force. The death of the officer is treated as if it had been in action, and a gratuity is issued to the widow in addition to pension.

### Missing R.A.F. Officers in Iraq

MR. GALBRAITH asked the Under-Secretary of State for Air whether any information has been received with reference to Pilot-Officer Stewart and Lieut. W. S. Day, who were recently lost in the Iraq desert; and what further steps it is proposed to take in order, if possible, to ascertain what has happened to them?

MR. LEACH: I regret that despite exhaustive search by aircraft, armoured cars, mounted police, and some tribal patrols, which continued almost unceasingly for four days following their disappearance, no trace of the two officers could be found, apart from footprints in the immediate vicinity of their aeroplane. This search was finally abandoned on the fourth day. Police and special service officers have since continued to prosecute inquiries in the villages, but no clue has been obtained, and it is feared that the officers have lost their lives. A Court of Inquiry has been held, and its proceedings are now awaited. It is anticipated that these will show that every possible step has been taken to trace the missing officers.

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### Presentation to Sgt. Andrews

SGT. R. ANDREWS, who accompanied Sqdn.-Ldr. MacLaren on the recent British world-flight attempt, received a presentation at Knaphill, Woking—his native place—on October 10. The presentation was made by Mr. H. Quartermaine, vice-chairman of the Woking Urban Council, and took the form of an illuminated testimonial bearing the inscription:—"This illuminated testimonial was presented to Sergeant R. Andrews, R.A.F., as a memento of the occasion, from his fellow-members of the Knaphill Working Men's Club, who wish to record their appreciation of the gallant effort made by him and his companions during the recently-attempted world flight."

### French Air Manœuvres Postponed

TERRIFIC gales were responsible for the postponement of the French military air manœuvres at Rambouillet last week-end, and also for a dozen or so crashes, one of which resulted in the death of two airmen. In the latter case an aeroplane belonging to the 34th Aviation Regiment left Le Bourget for Rambouillet on October 8, but crashed soon afterwards, Adjutant Becquet, the pilot, and Sergt. Champeau, the mechanic, being killed.

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### SIDE-WIND

At the annual meeting on October 13, in Carlisle, of the Central Board of Shipbuilding Employers' Federation, Mr. John Barr, of Vickers and Co., was elected president for the ensuing year, and Mr. A. J. Campbell, of Beardmore and Co., was elected one of the vice-presidents, the others being Mr. J. T. Batey, of Hawthorn, Leslie and Co., Newcastle, and Sir Andrew R. Duncan.

■ ■ ■ ■ ■

### PUBLICATIONS RECEIVED

*National Physical Laboratory: Report of the Advisory Committee for the William Froude National Tank, for Year ending December 31, 1923.* London: H.M. Stationery Office, Kingsway, W.C.2. Price 6d. net.

*Income Tax and Super-Tax, 1842-1925. Tabular View.* Oliver and Boyd, 33, Paternoster Row, London, E.C. Price 1s. net. By post 1s. 1d.

*The Osram Bulletin: Special Publicity Number, 1924-25.* General Electric Co., Ltd., Magnet House, Kingsway, London, W.C. 2.

*The Mechanical Boy. Vol. 1, No. 1. September 4, 1924.* Percival Marshall and Co., 66, Farringdon Street, London, E.C.4. Price 3d.

*Aeronautical Research Committee, Reports and Memoranda: No. 892 (Ae. 122).—Experiments with a Family of Airscrews: Part III. Analysis by Means of the Vortex Theory and Measurements of Total Head.* By C. N. H. Lock and H. Bateman. December, 1923. London: H.M. Stationery Office, Kingsway, W.C. Price 2s. net.

*U.S. National Advisory Committee for Aeronautics: No. 198. Micarta Propellers—I. Materials.* By F. W. Caldwell and

N. S. Clay. August, 1924. No. 199—Micarta Propellers—II. Method of Construction. By F. W. Caldwell and N. S. Clay. August, 1924. No. 200—Micarta Propellers—III. General Description of the Design. By F. W. Caldwell and N. S. Clay. August, 1924. U.S. Government Printing Office, Washington, D.C., U.S.A.

*The Measurement of Fluid Velocity and Pressure.* By J. R. Pannell. London: Edwin Arnold and Company. Price 10s. 6d. net.

*Proceedings. Session 1922-23. Vol. XVII. The Rugby Engineering Society, Rugby.*

*Bulletin de la Fédération Aéronautique Internationale, Septembre, 1924. Fédération Aéronautique Internationale, 35, Rue François 1er, Paris.*

### Catalogue

*Books on Aeronautics, Engineering, etc.* McGraw-Hill Publishing Co., Ltd., 6, Bouverie Street, London, E.C.4.

■ ■ ■ ■ ■

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HELICION AERONAUTICAL COMPANY, LTD., 36, King Street, Cheap-side, E.C.3.—Capital £2,000, in £1 shares. Aeronautical, motor, mechanical and electrical engineers. Solicitors, J. J. Edwards and Co., 28, Sackville Street, W.1.

■ ■ ■ ■ ■

### AERONAUTICAL PATENT SPECIFICATIONS

Abbreviations: Cyl. = cylinder; i.c. = internal combustion; m. = motor. The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

#### APPLIED FOR IN 1923

Published October 16, 1924

- 15,253. J. DEMOCRATIS. Parachutes. (221,849.)  
15,836. MOTOR EXPERTS, LTD., and S. MILLS. Heating of aircraft, etc. (221,864.)  
17,818. H. N. WALLENS. Metal propellers. (221,906.)  
18,146. LORD INVERNAIN (W. BEARDMORE) and A. E. L. CHORLTON. I.c. engines. (221,911.)  
27,317. BOULTON AND PAUL, LTD., and J. D. NORTH. Control surfaces of aeroplanes. (221,986.)

#### APPLIED FOR IN 1924

Published October 16, 1924

- 3,667. SIR W. G. ARMSTRONG, WHITWORTH AND CO., LTD., and W. OSBORNE. Clutches for power transmission. (222,029.)  
5,133. G. FORNACA. Superfeed systems for i.c. engines. (222,037.)  
13,666. A. PENSOVECCIO. Propeller gear. (217,223.)

### Secret Patents re-assigned to the Inventor

#### APPLIED FOR IN 1914

Published October 16, 1924

- 16,996. F. L. M. BOOTHBY. Airships.

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